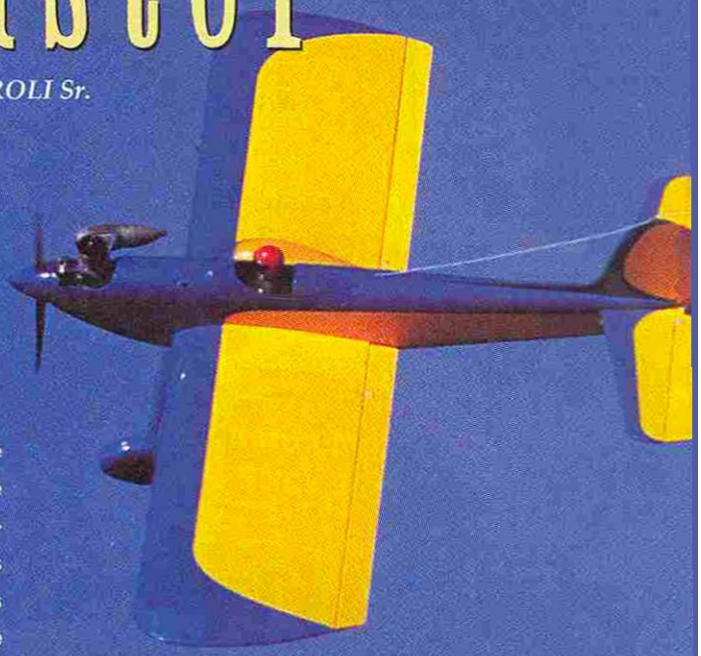
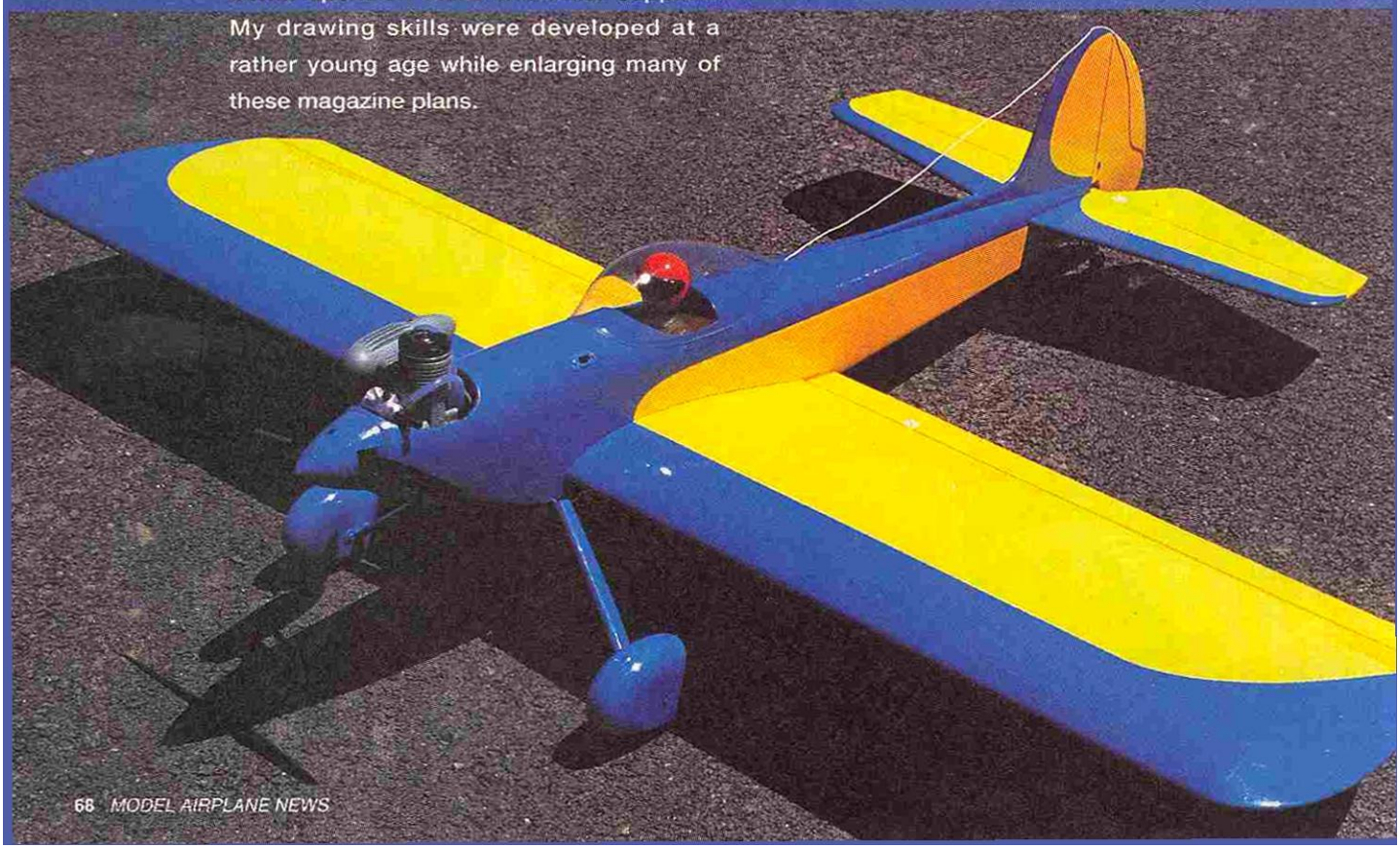
R/C replica of Harry Williamson's 1951 Ukie

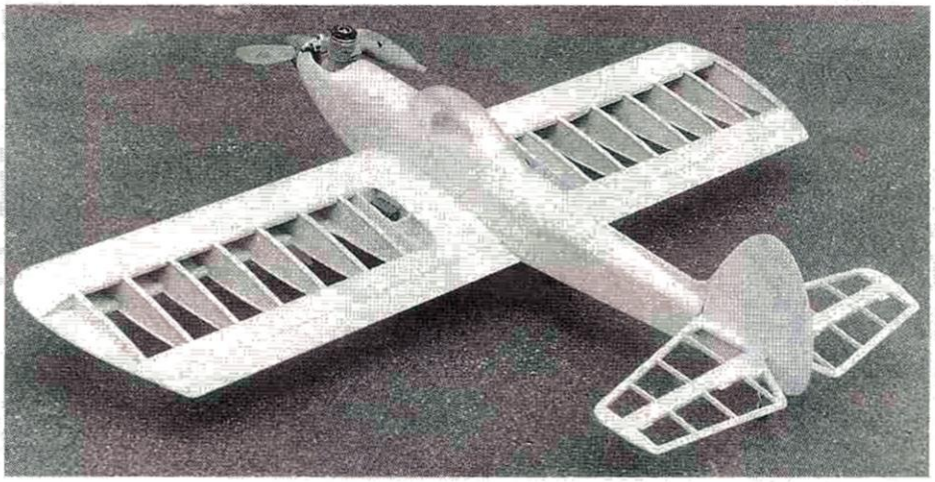
The Ringmaster

by NICK ZIROLI Sr.



THERE WERE many attractive sport and stunt control-line models designed in the late 1940s and 1950s, and I've built many of them. Kits back then, though, were priced from $1.50 to $4 and were generally out of my financial reach, so this made scratch-building from magazine plans my only alternative. Full-size plans were inexpensive and, in many cases, were included in the magazines featuring the model. If the full-size plans were not included, often, the ribs and formers were. Besides, I was always too impatient to order and wait for the plans, and they cost money that could be better spent on balsa and other supplies. My drawing skills were developed at a rather young age while enlarging many of these magazine plans.





The bare bones of the new Ringmaster show its simple lines and conventional construction. The flat, symmetrical airfoil wing is reminiscent of the original 1951 Williamson control-line design.

The October 1951 issue of *Model Airplane News* included a good-looking control-line stunt model, designed by Harry Williamson, called the Ringmaster. Today, this is a confusing name because a few months after Williamson's article was published, Sterling Models brought out their now famous control-line model, the Ring Master (two words). The model I am presenting here in R/C form is a representation of the earlier Williamson Ringmaster (one word), which was also republished by *Model Airplane News* as a Golden Oldie in the April 1980 issue.

THE NEW RINGMASTER

My brother Bo had built the Williamson Ringmaster when it had first come out and suggested it as a good choice when I told him I wanted to adapt an old-time control-line model to R/C. Just as in the old days, I enlarged the magazine plans. I enlarged the wingspan to 54 inches instead of the original 42-inch span, an increase of about 30 percent. I added strip ailerons to my R/C version, though the original Ringmaster did not have stunt flaps on the wings. I chose about 625 square inches of wing area so the model could be powered by one of the many .40- to .50-size engines currently available. Even though I changed some of the model's proportions to make it more suitable for R/C, the model remains unmistakably a Ringmaster.

CONSTRUCTION

The Ringmaster's construction is rather conventional, though maybe a little more overbuilt than some of the newer super aerobatic designs. Begin by building the wing, as this is the most time consuming part of the project. I like to get the wing underway first and then take breaks from it to build the fuselage and the tail surfaces. The wing can be built either in one piece or in two halves that are then joined together later. I prefer to build it in one piece. I use Zap* CA for most of the construction.

Tack-glue the ½-inch-square rib shim into place over the plan where shown and pin the ¼x½-inch bottom spar to the plan. Join the spars in the center between the W-1 ribs with a ¼x½-inch doubler, then add the remaining ribs along with the ⅛-inch-thick plywood joiners WJ-1 and WJ-2. Install the top spar followed by the ¼-inch-square leading and trailing edges. Now sand the LE to conform to the shape of the ribs.

If you plan to install two aileron servos (one in each wing panel), be sure to include ribs W-2A and W-1A to support the plywood servo-mount rails. Since W-1A sets the servo rail locations, make certain that it suits the servos that are being used. Lay the servo over the plan, and modify the rail location on W-1A so the servo output shaft will protrude through the surface of the wing. The servo arm will be outside of the wing after the wing has been covered. Glue one side of the TE

BILL OF MATERIALS

QUANTITY	SIZE	USE
Balsa		
4 sheets	1/16x4x36 in.	LE covering
4 sheets	1/16x3x36 in.	TE and center section covering
4 sheets	3/32x4x36 in.	Ribs, wingtips and fuse bottom
4 sheets	1/8x3x36 in.	Fuse sides, formers and planking
2 sheets	1/4x4x36 in.	Stabilizer and rudder
3 strips	1/4x1/4x36 in.	LE, TE and stringers
2 strips	1/4x3/8x36 in.	For built-up stabilizer
5 strips	1/4x1/2x36 in.	Wing spars and stabilizer
2 pieces	5/16x1 1/4x36 in.	Tapered ailerons
1 piece	3/4x3x6 in.	Bottom nose block
Plywood		
1 piece	1/16x6x18 in.	Doublers
1 piece	1/8x6x12 in.	F-2, WJ-1 and WJ-2 wing joiners and misc.
1 piece	1/4x6x6 in.	F-1, LG-1 and servo rails
Misc.		
1 piece	5/32-in.-dia. music wire	landing gear

Accessory set containing vacuum-formed plastic cowl, canopy and wheel pants is available from Nick Ziroli Plans, 2231-23 Fifth Ave., Ronkonkoma, NY 11779; (516) 467-4765; price $19.95 plus $4 UPS in the continental USA.

SPECIFICATIONS

Model: Ringmaster

Type: R/C sport aerobatic replica

Wingspan: 54 in.

Wing area: 625 sq. in.

Weight: 74 oz.

Wing loading: 17 oz. per sq. ft.

Length: 39 in.

Airfoil: symmetrical

Engine req'd: .40 - .50 2-stroke, .45 - .60 4-stroke

Engine used: Estes MDS .40

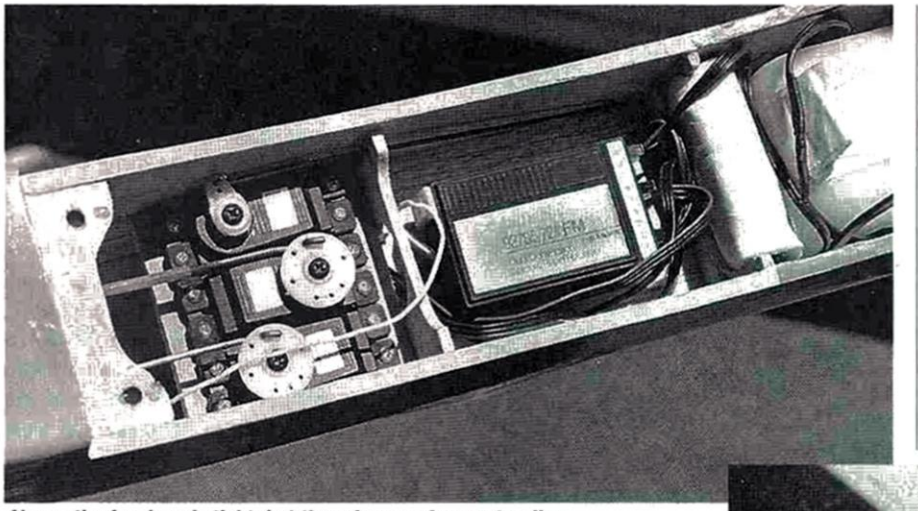
Radio req'd: 4-channel (aileron, rudder, elevator and throttle)

Radio used: Airtronics Infinity

Features: designed by Nick Ziroli Sr., the new Ringmaster is built of conventional balsa and plywood and has a flat, (no dihedral) symmetrical airfoil wing. The stabilizer and elevator are built up, and the fin and rudder are made from ¼-inch sheet balsa. A vacuum-formed engine cowl, canopy and wheel pants are available from Nick Ziroli Plans.

Comments: the Ringmaster is a 30-percent-enlarged, R/C version of the 1951 control-line Ringmaster designed by Harry Williamson that was published in the October 1951 issue of *Model Airplane News*.

PHOTOS BY NICK ZIROLI & GERRY YARRISH



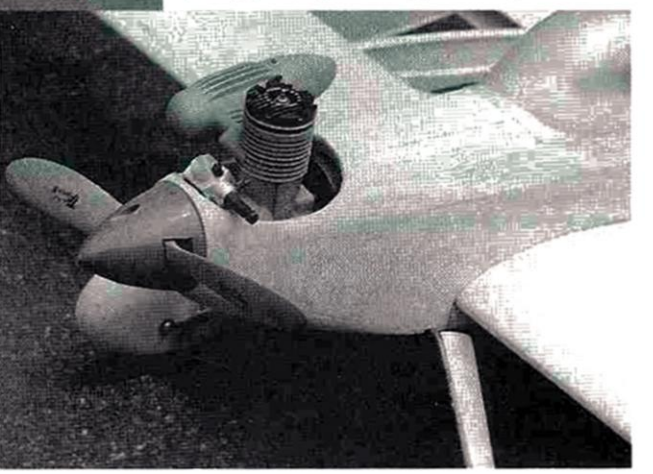
Above: the fuselage is tight, but there is room for most radios.

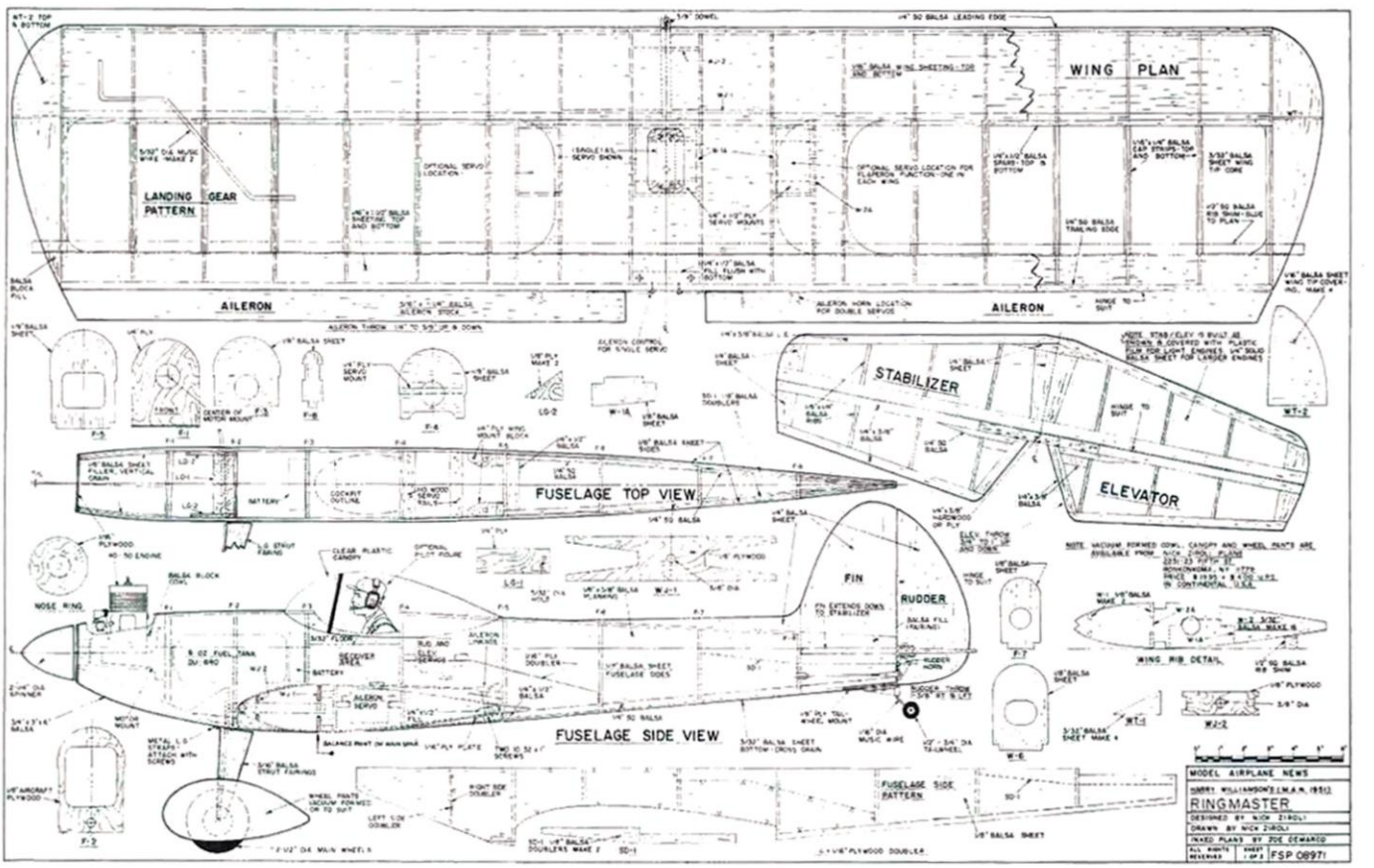
sheeting into place. When the glue has dried, glue the other TE sheeting into place, and then pin or clamp the entire TE to a flat surface or straightedge. I have found that a length of 1-inch-square aluminum tube is good for this purpose. Now glue the 1/4x1/2-inch filler block inside the TE between the two W-1 ribs.

Cover the LE with 1/16x4-inch balsa sheeting. Place the aft edge of the LE sheeting 1/8 to 3/16 inch forward of the main spar's aft edge. This makes for an even joint between the LE sheeting and the fronts of the capstrips. Cover the center section of the wing with 1/16-inch balsa sheeting. If two aileron servos are to be used, extend the sheeting out past the servos, and cut openings in the sheeting to accommodate the installation of the servos. Though not necessary, I like to radius the corners of the sheeting between the ribs and the leading and trailing edges. Radius corners not only make the structure look better, they add strength and keep the covering from wrinkling in the corners.

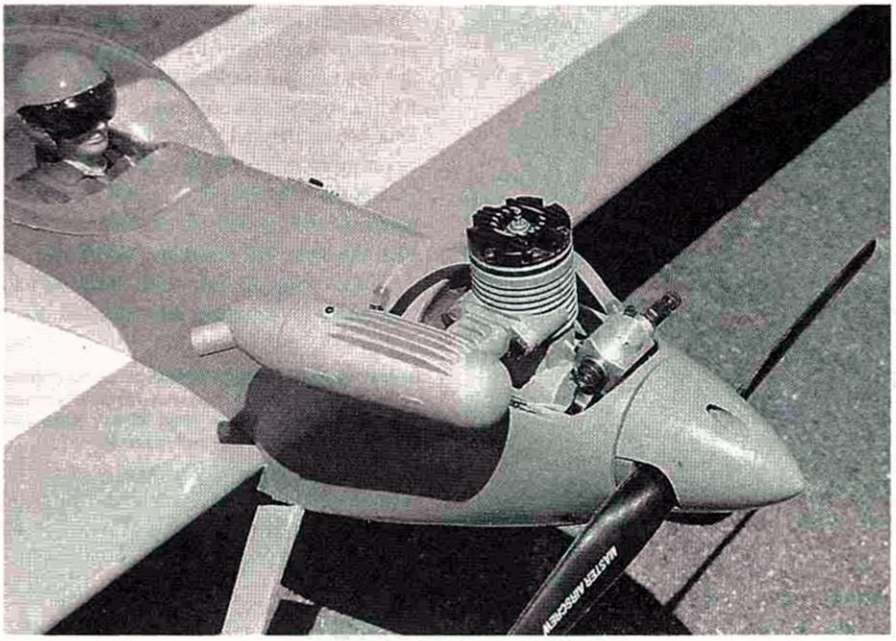
Add the wingtips, W-T1, W-T2 covering pieces as well as the rib capstrips. To prepare the wing for covering, shape the LE and block sand all the joints. Next, fit and trial hinge the ailerons into place but don't

Below: the prototype includes a wood engine cowl section, but a vacuum-formed engine cowl is available from Nick Ziroli. Note the strip planking on the upper fuselage.





To order the full-size plans (FSP08971), see Pilots' Mart page 113.



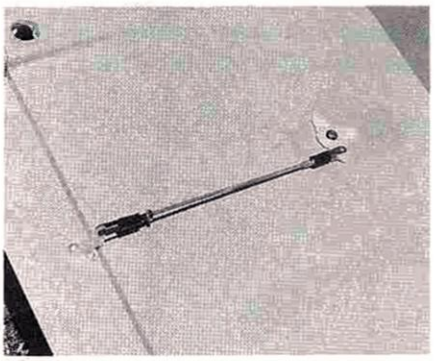
An Estes MDS .40 is used for power. The engine is a good match for the Ringmaster, and performance is strong and consistent.

permanently install the aileron hinges until the surfaces have been covered. Cut a hole at the center of the LE for the wing-mount dowel. File the hole to shape until it lines up with the holes in WJ-1 and WJ-2. Epoxy the dowel into place leaving about 3/8 inch of the dowel protruding from the LE. Now drill two 1/8-inch-diameter holes through the wing where the wing hold-down bolts will be installed.

FUSELAGE

Begin the fuselage by gluing the plywood doublers to the balsa sides. As always, be sure to make a left and a right side. Note that the right side doubler is a little shorter than the left. This builds the correct amount of right thrust into the firewall. Add the 1/4-inch-square bottom corner stringers and the stabilizer doublers SD-1. Mark the locations of all the formers on the inside of the fuselage sides, then glue into place formers F-2, F-3 and F-4 on one of the sides. Be sure all the formers are square, 90 degrees, to the side. Glue the other fuselage side to the formers, and make sure that the top edges of both sides line up with each other when viewed from the side. Pull the sides together at the tail and glue. Add the rest of the formers as well as the firewall. I like to bolt the engine to the mount and install the engine mount on the firewall (with 4-40 bolts and blind-nuts) before gluing the firewall into place. Epoxy the 1/4x1-inch plywood landing-gear mount and wing-mount blocks into place. Fit the wing to the fuselage, and adjust the hole in former F-2 so the dowel is a tight fit when the wing is seated properly on the fuselage. When satisfied with the fit and the wing is square to the fuselage, drill through the 1/8-inch holes in the wing and into the wing-mount blocks. Redrill the holes in the wing-mount blocks with a 5/32-inch drill, and then enlarge the holes in the wing with a 3/16-inch drill. Try to drill the holes square to the bottom surface of the wing so the heads of the hold-down bolts will sit flat on the wing's surface. Tap the holes in the wing hold-down blocks with a 10-32 tap. Make and install a 1/16-inch-thick plywood plate to go on the outside of the wing to strengthen the wing where the mount bolts pass through it. Remount the wing, and check that everything is still square and that the wing fits properly, then remove. Glue the cockpit floor into place and install the 1/4-inch plywood servo-mount rails.

Bend the landing gear to shape from 5/32-inch diameter music wire. Epoxy a 1/8x5/16-inch plywood strip along each edge of the landing-gear-mount block to form a slot for the gear wire to fit into. Epoxy a 1/8-inch-square plywood spacer on one side



I used dual aileron servos so I could use the ailerons as flaps and mix them with the elevator.

FLIGHT PERFORMANCE

• Takeoff and landing

Powered by the Estes MDS .40 engine, the Ringmaster has more than enough power and performance. During takeoff, the relatively long tail moment keeps everything straight, and only a slight amount of rudder is required to keep everything lined up. Climb-out is effortless, and the model gets up on step quickly. For landings, the model requires a little power as the thick, symmetrical wing produces a fairly high sink rate on final. Rollout is like that of any other sport tail dragger model.

• Low-speed performance

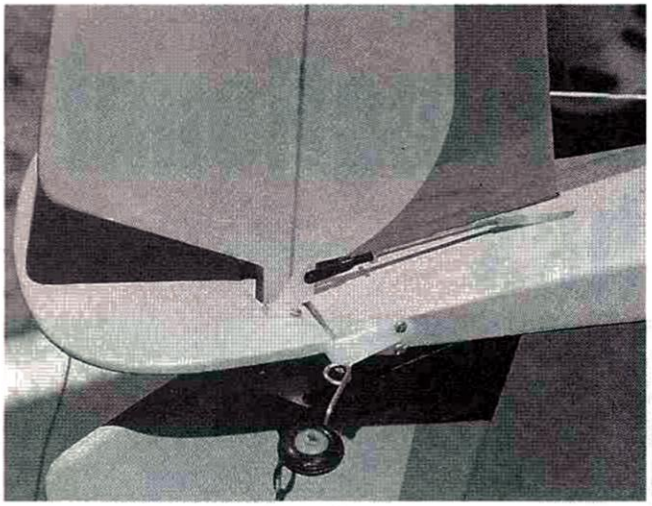
The Ringmaster flies very well at slower speeds, and control remains good. With the ailerons/flaps coupled to the elevator, a fair amount of lift is generated, and response remains positive. Flown at moderate speeds, the model has no bad habits.

• High-speed performance

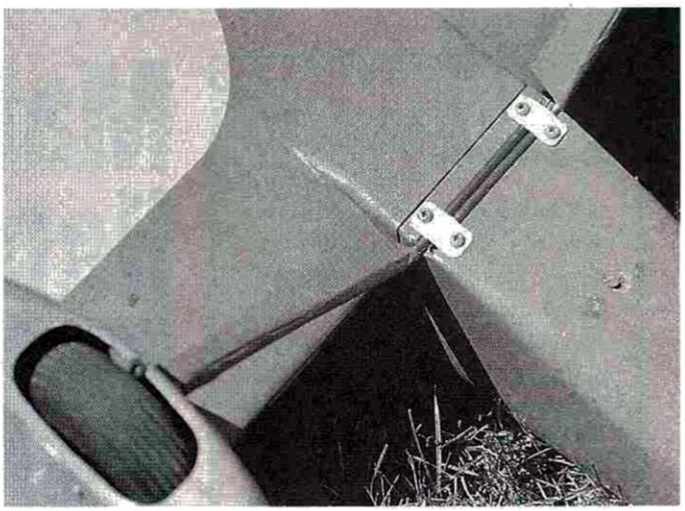
The Ringmaster is a good all-around sport model, and at high speeds, it tracks and flies smoothly. Control response is very good if set up with the control throws shown on the plans. No trim changes are required.

• Aerobatics

The solid construction and moderate wing loading make the Ringmaster a very nice aerobatic performer. It is not an unlimited aerobatic machine; I did not design it that way. The symmetrical airfoil and no dihedral wing platform give quick response to control inputs. Inverted flight requires a slight amount of down-elevator. If you use dual aileron servos and have a computer radio like my Airtronics Infinity, which allows elevator-to-flap mixing and flaperon-wing mixing (ailerons act as flaps and spoilers), the aerobatic flight performance of the model will be greatly tightened up.



Nothing unusual here: the tail control linkage is simple and straightforward.



5/32-inch diameter music wire is used for the landing gear, and it fits into a slot in the bottom of the fuselage. Metal straps hold the gear in place.

and in front of former F-2 and a 1/8x1/4-inch spacer in front of former F-2 on the other side. Now insert the landing-gear wire, and add the front gusset pieces LG-2 that lock the gear in place. Make thin aluminum or steel straps, and mount them with 1/2-inch-long sheet-metal screws to hold the landing gear in place. Cut to shape, and install the 3/16-inch balsa landing-gear fairings. I grooved the front of the fairings and glued them to the landing gear with Pacer Technology all-purpose Zap-a-Dap-a-Goo adhesive.

Plank the top of the fuselage from the firewall to former F-8 with 1/8x3/8-inch balsa strips. Install the servos and pushrods, and then cover the bottom of the fuselage with cross-grain 3/32-inch balsa. The plans show an all balsa cowl, but I have since made a vacuum-formed cowl to save some weight and time. The cowl, wheel pants and a canopy are available from Nick Ziroli Plans*.

THE TAIL

Build up the stabilizer over the plan, or cut it from solid 1/4-inch balsa sheet. Cover and hinge the surfaces before installing it on the fuselage. The fin and rudder are made from 1/4-inch sheet balsa. The fin extends down to the top of the stabilizer. Make the fin fairings by first tack gluing a piece of 1/4-inch balsa in the stabilizer saddle flush with the top of the fuselage. Add another piece of 1/4-inch balsa to act as a spacer for the fin, but make it even with the top of the fairing blocks. Tack glue the filler blocks to each side of the fin spacer, then carve and sand the fairing blocks to shape. Now remove the spacer and filler blocks.

When I cover a model with plastic film—in this case, Coverite* Black Baron—I prefer to cover the fuselage, stabilizer, fin and fairing blocks separately and then assemble all the parts. Once all the parts of the model have been covered, you can start final assembly.

FINAL ASSEMBLY

Install the engine and the fuel tank. For my prototype, I used the Russian-made MDS .40 available from Estes Industries*. I must say I have been very pleased with its performance. Room is at a premium in the fuselage, so I used a Du-Bro* 8-ounce fuel tank and placed a flat Rx battery pack positioned vertically behind it. The Rx is strapped to the bottom of the cockpit floor. I used an Airtronics* Infinity radio and two servos in the wing (one for each aileron). This setup allows me to use the ailerons as flaps and to mix flaps with the elevator (up elevator, down flaps) for increased lift and tighter turns. Down elevator brings the flaps up like spoilers.

The Ringmaster should be balanced within 1/4 inch of the position shown on the plans. If not, add weight to the nose or tail until it is. My model did not require any balance weight. Set the model up with the control throws indicated on the plans, and be sure that none are reversed. I think you will like the flight performance. The Ringmaster handles very well on the ground and produces nice straight-line takeoffs. In the air, it is smooth and predictable with no bad habits. I hope you will feel the project was worthwhile and enjoy flying your Ringmaster.

The new Ringmaster all dressed up and ready to go. The 30-percent enlarged, R/C conversion of the original Williamson 1951 control-line model is a real pleasure to build and fly.

*Addresses are listed alphabetically in the Index of Manufacturers on page 126.